Southwest Harbor Quadrangle, Maine

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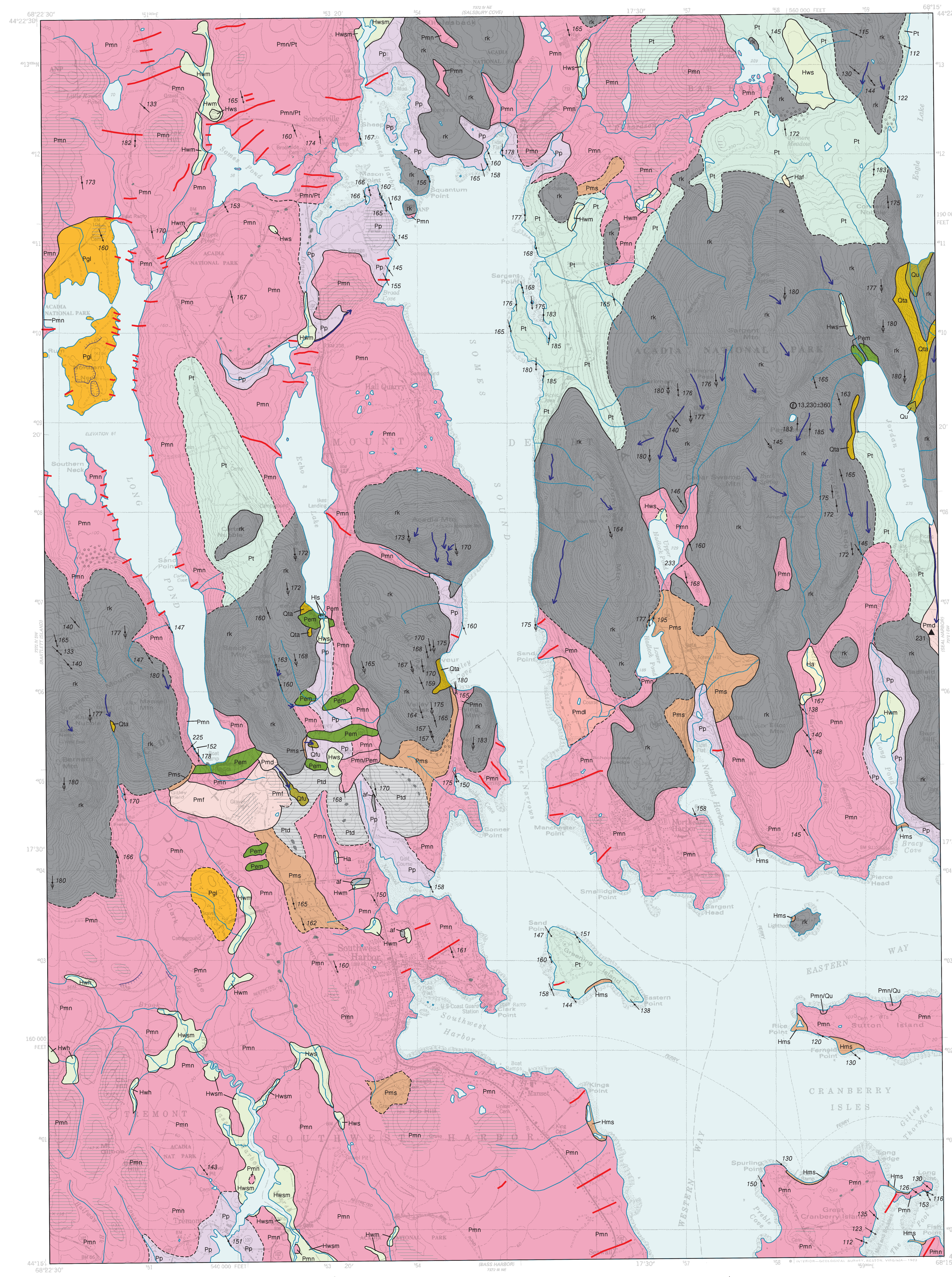
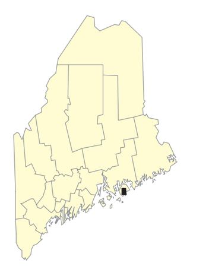
For additional information,
see Open-File Report 00-146.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping of the Southwest Harbor quadrangle was conducted by Thomas V. Lowell during the 1988 field season. Funding for this work was provided by the Maine Geological Survey, Department of Conservation.



Quadrangle Location

SCALE 1 : 24,000

1 MILE — 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Southwest Harbor quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

HOLOCENE DEPOSITS

- **Ha** — **Stream alluvium** - Sand, silt and minor amounts of gravel deposited on flood plains of modern streams.
- **Hls** — **Lakeshore deposit** - Deposits of gravel and sand formed by wave action along lake shores. Only one of these deposits, located at the south end of Echo Lake, is large enough to show on the map.
- **Hms** — **Marine shoreline deposit** - These extensive deposits of cobble to boulder sized material lie between rock headlands near Kings Point, and on Greening, Sutton, and Great Cranberry Islands. Four of the nine mapped deposits face south. Buried tree stumps exposed on Greening Island and on the south side of Great Cranberry Island suggest that these deposits are transgressing landward.
- **Haf** — **Alluvial fan** - Postglacial fan located north of Sargent Mountain.
- **Hwh** — **Wetland, heath** - Mosses, grasses and sedges are the dominant vegetation found here. Peat thickness varies consideralbly. Standing water is common.
- **Hwm** — **Marsh** - Wet areas of mixed marsh grass; may be 2-3 meters (6-10 ft) thick in places.
- **Hws** — **Swamp** - Generally these deposits are very thin and overlie bedrock. Some small units of Hws result from beaver dams.
- **Hwsm** — **Salt marsh** - This unit is only present at the heads of Bass Harbor and Somes Sound.

PLEISTOCENE DEPOSITS

- **Pem** — **End moraine** - Several large moraines lie at the southern ends of Long Pond and Echo Lake. These are generally composed of sandy diamictons and poorly to well stratified sediments. Several small moraine crests line the shore of Long Pond, occur to the northwest of Somesville, and at the south end of Somes Sound. Small moraines are rare south of the central hills.
- **Pgi** — **Ice-contact gravel** - Gravel and sand deposited in contact with melting glacial ice.
- **Pmd** — **Marine delta** - Small deltas formed at the south ends of Long Pond and Jordan Pond. Some elements of the Pms unit near Lower Hadlock Pond may be of this origin.
- **Pmdi** — **Marine ice-contact delta** - Flat-topped ice-contact delta composed primarily of sorted and stratified sand and gravel. Deposit was graded to surface of late-glacial sea and is distinguished by a flat top, and foreset and topset beds.
- **Pmf** — **Marine fan** - Layered gravel and sand deposited on the seafloor in a wedge or mound form at the glacier margin during marine submergence.
- **Pmn** — **Marine nearshore deposits** - This major unit is extensive both north and south of the central hills. Generally, it is a few decimeters up to two meters thick and composed of coarse poorly sorted gravel. Locally, this gravel has been exploited for aggregate resources. Bedrock knobs may extend through this unit, and it may overlie bedrock, moraines, and several other units. Relic shoreline features mark the upper limit of this unit on both sides of Long Pond, south of Jordan Pond, and the northwest flank of Sargent Mountain. Locally overlies till where indicated (Pmn/Pt or Pmn/Pem).
- **Pms** — **Marine shoreline deposit** - Several small deposits ring the southern ends of the central hills, and they are comprised mostly of boulder lags. Well-defined shoreline deposits occur at elevations up to 65 m (213 ft); however, many unmappable occurrences were found at both higher and lower elevations.
- **Pp** — **Presumpscot Formation** - Fine-grained marine mud (silt and clay with local sandy beds and intercalations) locally with marine fossils and dropstones deposited in deeper quieter water during the marine submergence of the coastal lowland.
- **Pt** — **Till** - Poorly sorted mixture of gravel, sand, silt, and clay deposited directly by the glacier ice.
- **Qfu** — **Fan, age and/or origin uncertain** - This is restricted to two small occurrences north of Southwest Harbor and one occurrence northeast of Sargent Mountain.
- **Qta** — **Talus** - Extensive deposits especially along the eastern flanks of the central hills. Some of the deposits are more than 10 m (33 ft) thick and at least one deposit at Valley Cove extends below present sea level.
- **Qu** — **Quaternary deposits, undifferentiated** - Surficial deposit of uncertain age and origin.
- **Ptd** — **Thin drift, undifferentiated** - This unit is separated from the Pmn unit because sediments of that unit are generally thicker..
- **af** — **Artificial fill** - This unit is limited to along roadways and building sites. Of very minor extent in this map area.
- **rk** — **Bedrock** - The dominant map unit for this quadrangle, which consists either of barren rock ledges or of thin soil material that supports vegetation. This unit is almost continuous above 65 m (213 ft) elevation, but is also common at lower elevations.

Contact - Indicates boundary between adjacent map units, dashed where approximated.

135 **Glacial striation or groove** - Arrow shows direction of former ice movement. Dot marks point of observation. Symbol without arrow indicates uncertain ice-flow direction.

Meltwater channel - Curved arrow shows direction of former meltwater flow measured from current indicators such as cross-bedding in sediments.

End moraine - Ridge of till, sand, and gravel deposited and/or deformed by glacier ice.

Terrace scarp or kettle hole - Indicates marine wave-cut scarp, or outline of kettle hole. Hachures on downslope side.

Thin-drift areas - Ruled pattern indicates areas of many outcrops and/or thin surficial deposits (generally less than 2-3 m (6-10 ft thick).

10,150±450 **Nonmarine fossil locality** - Indicates site where nonmarine fossils were located. Sites where radiocarbon age estimates were obtained also show radiocarbon age estimate.

135 **Ice-flow indicator** - Bedrock indicator of glacial ice-flow direction. Includes crescentric marks and stoss-and-lee topography. Cross indicates point of observation.

Boulder field - Area of many large boulders (> 1 m [3 ft]).

▲350 **Glaciomarine delta** - Number indicates elevation (in feet) of contact between topset and foreset beds, or of meltwater channel on delta surface, which marks position of corresponding sea level.

Disturbed earth - Original topography of these areas has been disturbed by gravel pit operation.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Lowell, T. V.,2000, Surficial geology of the Southwest Harbor 7.5' quadrangle, Maine: Maine Geological Survey, Open-File Report 00-146, 6 p.

2. Tolman, A. L., and Lanctot, E. M. (compilers), 1981, Sand and gravel aquifers map number 21, Hancock County, Maine: Maine Geological Survey, Open-File Map 81-54, scale 1:50,000.

2. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print).

3. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

6. Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Andersen, B. G., 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, *in* Anderson, W. A., and Borns, H. W., Jr. (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.